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(56) Documents Cited

GB 2138456 A EP 0536101 A EP 0282394 A  
EP 0233833 A WO 93/14365 A DE 003427164 A  
US 4586439 A

(58) Field of Search

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(54) Abstract Title

Deploying submunitions such as decoys

(57) An ammunition or pyrotechnical device for deploying sub-munitions and/or light signals, the firing sequence of which is controlled electronically, wherein the ammunition presents an externally accessible interface, preferably an infrared interface, for external programming. Thanks to such an ammunition it is possible for the first time to modify the firing sequence of sub-munitions under control by a computer even while located inside a thrower tube.

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Ammunition or pyrotechnical device for deploying sub-munitions, and an  
ammunitions thrower herefor

Modern decoy ammunitions frequently contain a series of submunitions in one cartridge casing.

To this end, the decoy cartridge is generally ignited by means of the thrower system, and in a definedly programmed temporal sequence the single sub-munitions are discharged in order to lead the guided missile further and further from its actual target.

Under practical circumstances this rigid setting of the firing sequence of sub-munitions has, however, been found to be not particularly effective as it frequently passes by the requirements of diverting the approaching guided missile as far as possible from its actual target, which may thus constitute a continued hazard, e.g., to vessels of a naval formation or the craft of an aircraft squadron.

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ammunition enabling variation of the sub-munitions firing sequences on short notice.

5 With respect to an ammunition or a pyrotechnical device, this object is attained through the characterising features of claim 1. With respect to a thrower system, the above object is attained through the characterising features of claim 11.

10 In accordance with the invention, the ammunition or the pyrotechnical device for deploying sub-munitions and/or light signals, the firing sequence of which is controlled electronically, includes an externally accessible interface for external programming.

15 Hereby it is possible to quickly adapt to particular environmental conditions such as, e.g., strong winds, and to program the ammunition in such a way that it will present optimum results under wartime conditions.

20 In accordance with claim 2, a decoy ammunition is preferred which, owing to the possibility of external programming, enables optimum adaptation of the ammunition to particular circumstances, such as, e.g., weather conditions.

25 In accordance with claim 3, the sub-munitions have different properties, in particular different decoy properties. This has the advantage that depending on the type of ammunition and of the sub-munition contained therein, different guided missiles - or in turn guided missiles employing different target acquisition techniques - may be warded off.

30 Thus, for example, a decoy ammunition may contain both infrared decoy ammunitions and radar decoy ammunitions.

Moreover it is conceivable that the sub-munitions present different infrared signatures.

35 In accordance with claim 4, the interface may be a conventional plug-type connection, such as, for example, a parallel or serial interface, e.g., of the RS 232 or USP types.

Thanks to a like plug-type connection, stocks of ammunition, such as on a ship, may preliminarily be programmed for different scenarios and may then optionally be re-programmed.

5

In accordance with claim 5, it is preferred that the interface is a wireless connection, in particular an infrared connection in accordance with claim 6. This opens the possibility of re-programming an ammunition already inserted into the thrower tube of a thrower system inside this very  
10 thrower tube by way of the thrower system.

This may, for example, be of particular importance if the trajectory of an approaching enemy guided missile is detected following firing of the first sub-munition from the object to be protected, and an optimum period  
15 after which firing of the next and the following sub-munitions is to take place is calculated by the computer system.

With this feedback process it is possible to ensure optimum effect in terms of diverting a guided missile and thereby enhance the safety of the  
20 object to be protected, such as of a ship, tank, airplane, or stationary object.

Moreover particularly infrared interfaces are extremely robust and have manifold applications.

25

Preferably the interface of the ammunition is programmed via a programming device or a computer, in particular a personal computer, wherein the computer may, for example, also access the program memory of the ammunition by way of the thrower system.

30

It is particularly preferred to program the firing sequence of the sub-munitions by way of the interface contained on the ammunition in accordance with claim 8. A particularly preferred embodiment of the present invention is given in claim 9, namely, due to the fact that the  
35 ammunition may be programmed by way of the interface while still inside a thrower tube shortly prior to being discharged, it becomes possible to

calculate the optimum firing sequence for the sub-munitions through feedback analysis of the approaching guided missile.

5 In particular, in accordance with claim 10 the time intervals for deploying sub-munitions or also light signals are programmed via the interface. Thus, for example, a particular light/disintegration pattern may be programmed in the pyrotechnical range.

10 The instant defense system presents a particularly advantageous configuration if an ammunitions thrower in accordance with claim 11 and/or 12 is used, which is still capable of programming the ammunition for deploying sub-munition or light signals while the ammunition is already located inside the thrower tube.

15 Another advantage of the inventive thrower system comprised of ammunition and ammunitions thrower is founded in the fact that not only the firing sequence of the sub-munitions can be optimised, but furthermore only a quantity of sub-munition definitely necessary for warding off an approaching guided missile must be fired.

20

As the stocks of ammunition in an object to be protected are inherently limited, this circumstance is of particular importance.

25 In a particularly advantageous manner, the inventive ammunition, in particular cartridge, is combined with a device for simulating (emulating) an empty load status of a thrower for cartridges in accordance with the German patent application entitled, "Vorrichtung zur Nachbildung (Emulation) eines Leerzustandes eines Werfers für Patronen sowie Patrone hiermit", by the present applicant and having the file number BU2966 of  
30 the same application date, the contents of which are herewith fully incorporated by way of reference.

## Claims

- 5           1.       An ammunition or pyrotechnical device for deploying sub-munitions and/or light signals, the firing sequence of which is controlled electronically,
- 10               **characterised in that**
- said ammunition presents an externally accessible interface for external programming.
- 15           2.       An ammunition according to claim 1, characterised by being a decoy ammunition.
3.       An ammunition according to claim 1 or 2, characterised in that said sub-munitions have different properties, in particular different decoy properties.
- 20           4.       An ammunition according to any one of claims 1 to 3, characterised in that said interface is a plug-type connection.
5.       An ammunition according to any one of claims 1 to 3, characterised in that said interface is a wireless connection.
- 25           6.       An ammunition according to claim 5, characterised in that said interface is an infrared interface.
7.       An ammunition according to any one of claims 1 to 6, characterised in that said interface may be programmed through a programming device or a computer, in particular a personal computer.
- 30           8.       An ammunition according to any one of claims 1 to 7, characterised in that the firing sequence of said sub-munitions may be programmed by way of said interface.
- 35

9. An ammunition according to any one of claims 1 to 8, characterised in that it may still be programmed by way of said interface while located inside a thrower tube.

5

10. An ammunition according to any one of claims 1 to 9, characterised in that the time intervals for deploying said sub-munitions or light signals may be programmed through said interface.

10

11. Ammunitions thrower, characterised in that it presents an interface for programming an ammunition according to at least one of claims 1 to 7.

15

12. The ammunitions thrower according to claim 11, characterised in that said interface is an infrared interface.



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Claims searched: 1-10

Examiner: R C Squire  
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## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): F3A; F3C (CAJ)

Int Cl (Ed.7): F42B; F41H; F42C

Other: Online:EPODOC, WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2138546A WALLOP (see particularly page 2 lines 3-10)	1-3 at least
X	WO 93/14365A WALT DISNEY (see particularly fig.23)	1 at least
X	EP 0536101A NOBELTECH (see particularly col.3 line 41 to col.4 line 3)	1,2 at least
X	EP 0282394A ALKAN	1-3 at least
X	EP 0233833A GOODYEAR (see particularly col.5 lines 1-28)	1 at least
X	US 4586439 WRANA,	1-3 at least
X	DE 3427164 DYNAMIT NOBEL	1 at least

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X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.